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OCTOBER 22, 1949

SCIENCE NEWS LETTER

TECHNOLOGY DEPARTMENT

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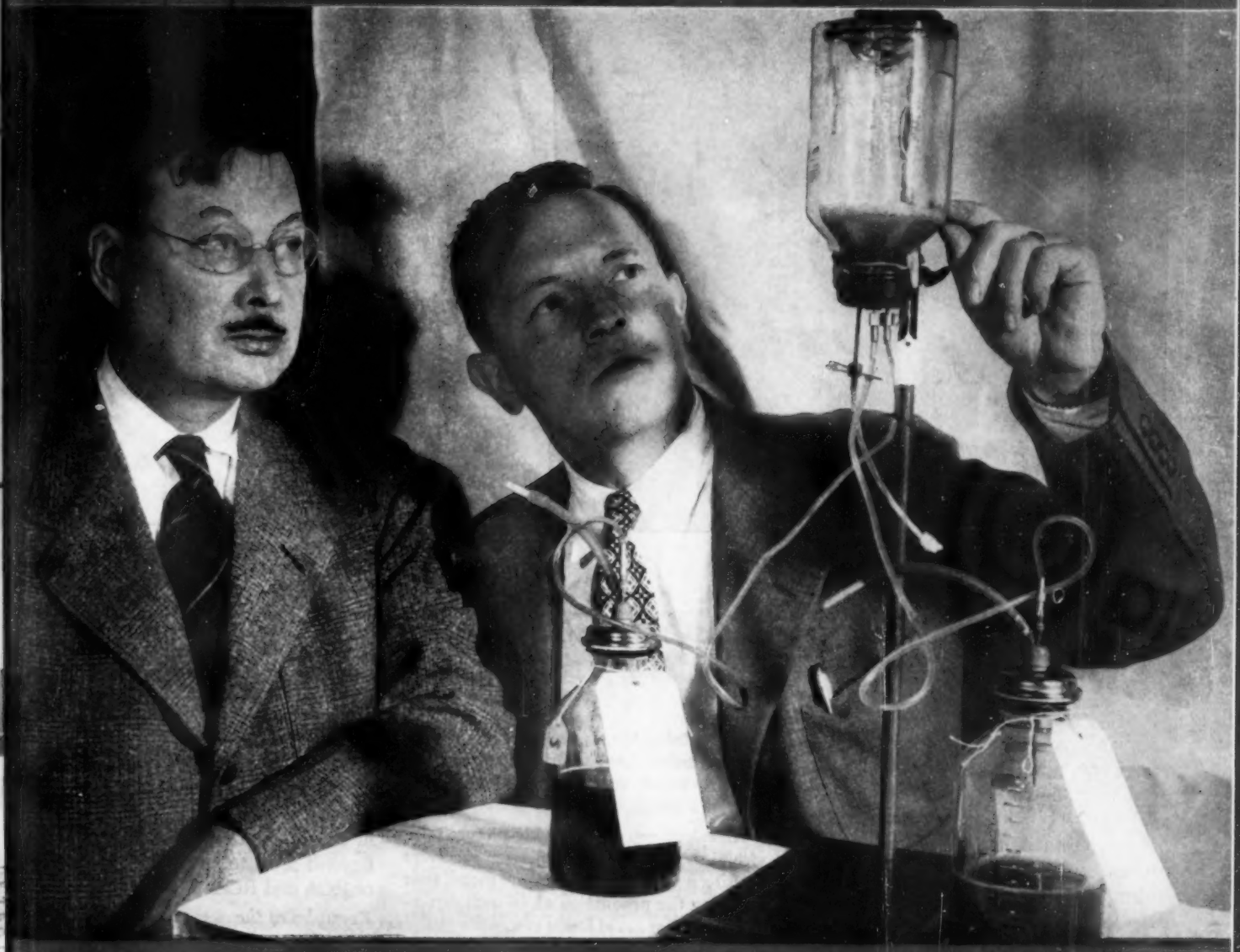
THE WEEKLY SUMMARY OF CURRENT SCIENCE



Stockpiling Blood

See Page 262

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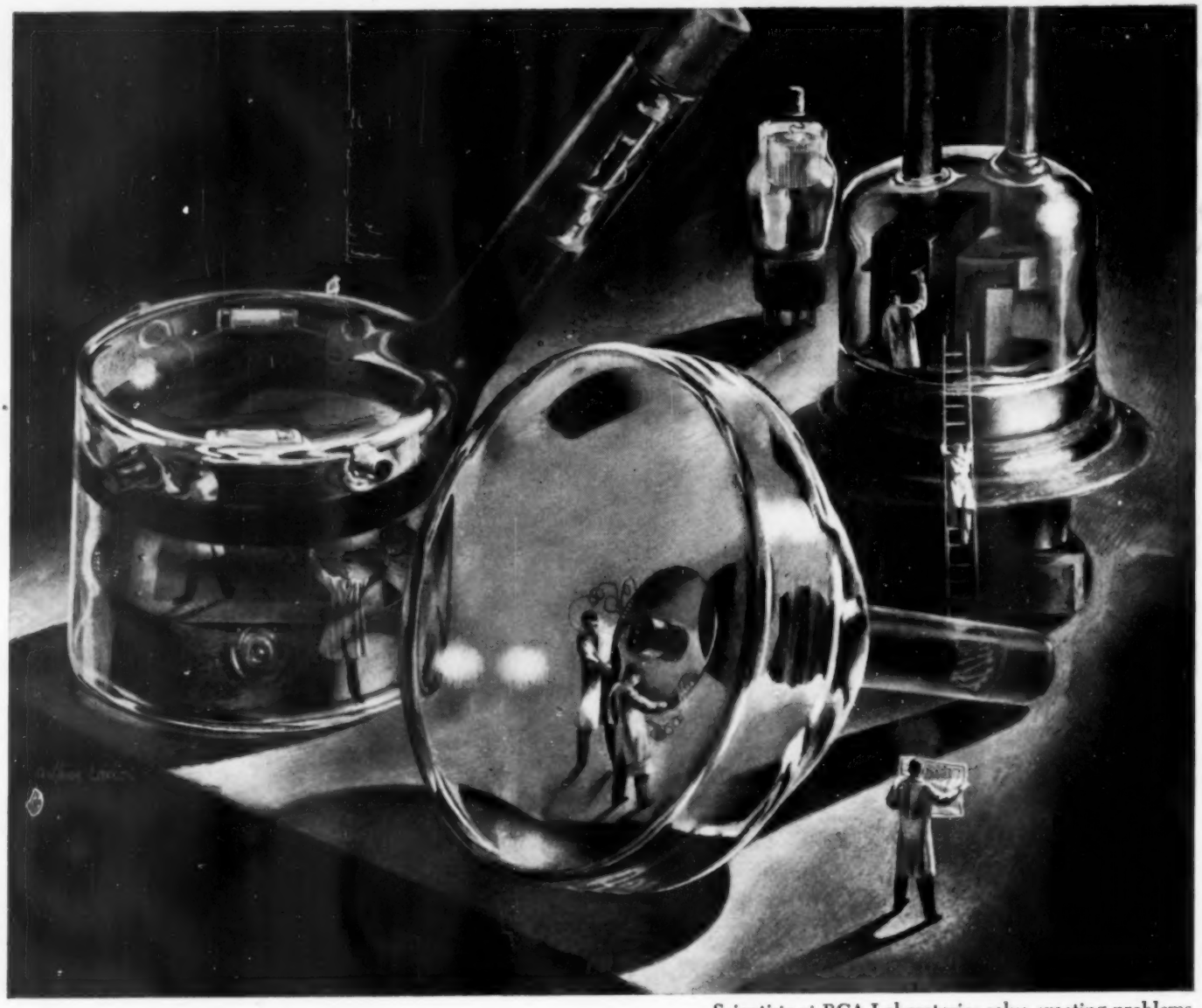


Scientists at RCA Laboratories solve exacting problems within the "nothingness" of vacuum tubes.

Inside story *of Better Television*

Now television is flashing *visual* entertainment, news, and educational material to millions of people. The "inside story" of its rapid growth is the history of some remarkable tubes. Inside these tubes, electrons are put to work—to perform, for your benefit, the miracle of long-distance vision.

The screen of your direct-view television receiver is actually the face of a tube—the kinescope developed by Dr. V. K. Zworykin and his colleagues of RCA Laboratories—on which electrons in motion "paint" pictures. A tube, too, is the "eye" of RCA's supersensitive Image Orthicon television camera, which can "see" clearly by the light of a match.

And since you asked for big-picture television, they developed projection receivers—also a way to "weld" glass and metal, thus speeding the production of 16-inch direct-viewing tubes . . . at lower cost.

To these basic "firsts," RCA scientists have added advance after advance, which are daily bringing television into the lives of more and more people.

How you profit

Advanced research in television tubes is just one way in which RCA Laboratories work in your interest. Their leadership in science and engineering adds *value beyond price* to any product or service of RCA and RCA Victor.

Examples of the newest advances in radio, television, and electronics—in action—may be seen at RCA Exhibition Hall, 36 West 49th Street, New York. Admission is free. Radio Corporation of America, Radio City, New York 20.

RADIO CORPORATION of AMERICA

World Leader in Radio—First in Television

ASTRONOMY

New Birth of Earth Theory

A pancake of gas and dust which rotated around the sun is the latest theory of the earth's origin. The moon was probably formed as partner planet to the earth.

➤ THREE billion years ago there was a giant cloud of gas and dust rotating around the sun. A few thousand years passed and a thin pancake was formed, a gigantic ring, in the plane of the present planets. Whirling eddies of matter appeared. These shrank and finally condensed into the planets and their satellites.

This is the latest theory of the origin of the earth and the rest of the planets, advanced by Dr. Gerard P. Kuiper, director of the Yerkes and McDonald Observatories of the Universities of Chicago and Texas.

Dr. Kuiper's new theory is a modern version of the early one put forth in 1755 by the German, Immanuel Kant. He speculated that the planets and the sun were formed from a single rotating gaseous cloud.

The mass of the planets-forming nebula around the sun in the Kuiper theory was about half that of the sun. The whirling eddies became what Dr. Kuiper calls "protoplanets", each of which went into the making of its planet and its satellites.

The ring of Saturn gives an idea of what the nebula looked like, since it is the only part that failed to condense. The reason was that it was too close to the planet.

The compositions of the planets were determined largely by the temperatures of the regions of the cloud from which they were formed. Mercury, Venus, and Earth, close to the sun, are dense materials which became solid at fairly high temperatures. Planets far from the sun, Jupiter, Saturn, Uranus and Neptune, are gases, water or ice and hydrocarbons.

Solar tides worked on the proto-planets and rotated them in the same direction as their motion around the sun. While the satellites of the planets were forming all the planets had rings like Saturn.

But the moon of the earth is an exception, according to the Kuiper theory. It was probably formed as a double planet as a partner to the earth. The earth and the moon were formed of solid matter that hailed down in a manner conceived by the earlier Chamberlin-Moulton earth origin hypothesis. The craters on the moon date from that time, and so does the Arizona meteor crater, the others on earth having been eroded away.

Science News Letter, October 22, 1949

GENERAL SCIENCE

Nobel Peace Prize Winner

➤ AWARD of the Nobel Peace Prize to Lord Boyd Orr, Scottish nutrition authority, marks the second time this award has gone to a scientist.

The previous award of the Peace Prize to a scientist came in 1922 when it went to Fridtjof Nansen, Norwegian Arctic explorer. Like Lord Boyd Orr, Nansen had turned from his scientific work in the field of exploration to problems of world hunger. At the close of World War I, Nansen directed relief work for famine-stricken Russia and later continued to direct two agricultural demonstration estates in the former famine areas.

"Nansen passports" owe their name to his work with refugees.

Lord Boyd Orr turned to problems of world hunger and their effect on world peace from the more conventional approach of researcher in nutrition. At Rowett Agricultural Research Institute in Aberdeen, Scotland, he organized surveys of the place of essential minerals, such as lime, salt, iodine and iron, in the diet of animals. He and his collaborators investigated the mineral content of the pastures of Britain, parts of Africa and elsewhere.

While in Africa, he made a study, famous in scientific nutrition circles, of two African tribes living side by side but following different methods of getting a living and consequently different diets. One tribe which tended herds lived chiefly on meat, milk and blood. The other tribe lived chiefly on cereals, tubers, green leaves and peas and beans. Members of the first tribe averaged five inches taller and 23 pounds heavier and had much greater strength than the second tribe. In the first tribe, 60% of the children under eight years rated "very good" in health and nutritional state, compared to 7% of "very goods" in the second tribe. And members of the second tribe had much more tooth decay, softer bones, and more sickness than the first.

From this experience and further study of diets of humans, who, he used to say, were much worse nourished than their animals, he turned to the broader problem of hunger and the food supply in relation to world peace.

In a Thanksgiving Day message to Americans, he predicted that the world food shortage would not end soon (See *SNL*, Nov. 22, 1947).

"It will continue for many years," he declared. "But it can be overcome, provided the nations act together on a unified plan. The solutions are to be found in more production and a more equitable distribution of food, together with a general improvement in the economic life of the people of the whole world.

"Then and only then may a Thanksgiving Day for the world be proclaimed."

Science News Letter, October 22, 1949

MEDICINE

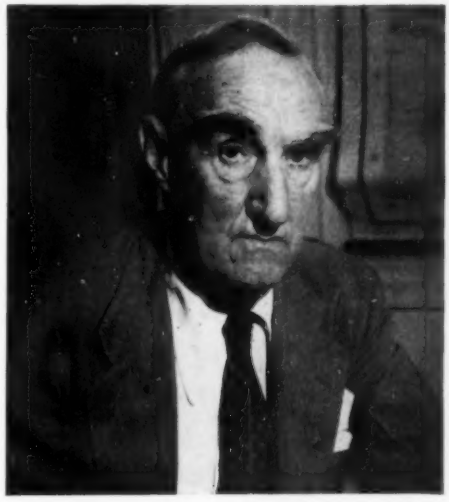
New Technique Aids Malaria Medicine Search

➤ HOPE of getting a better medicine against malaria, one which will attack the parasites of the disease in the early stages, is advanced through a new technique developed by Drs. I. N. Dubin, R. L. Laird and V. P. Drinnon of the University of Tennessee.

These scientists have developed a method of getting malaria parasites to grow on chick embryos so that scientists will be able to watch through the microscope the development of the parasite through all the stages of its life cycle.

During part of this cycle after a mosquito bite has deposited the malaria parasite, or germ, in human blood, the parasite disappears. Finding a medicine that will reach it during this stage of its development is the next object of the Tennessee doctors' Navy-supported research.

Science News Letter, October 22, 1949



NOBEL PRIZE WINNER—Lord Boyd Orr, Scottish nutrition authority, has been awarded the Nobel Peace Prize for 1949. The second scientist to receive this award, Lord Orr has made valuable contributions to the solution of world hunger problems and their effect on world peace.

MEDICINE

Lung Cavities Healed

➤ SKIN grafts are being used successfully to heal giant cavities of the lungs of tuberculosis patients at Grace Dart Home Hospital in Montreal, Canada.

In this procedure, developed by Dr. Arthur Martin Vineberg, the cavities are treated by drainage, much as an abscess would be. Then the cavity is opened further through the drainage opening and its walls and "floor" are covered with skin grafts.

"Gradually the boundaries of the cavity are lined with skin which grows out to meet the skin on the surface of the chest wall. The cavity thus becomes obliterated, leaving a defect in the chest wall," Dr. Vineberg states in a report to the *Society for Experimental Biology and Medicine*.

The first patient to receive this new treatment was a 52-year-old man with far advanced tuberculosis of both lungs. He had giant cavities at the apex of each lung. Drainage was established on the left side, but the patient's poor general condition prevented further collapse therapy to rest the lung, the usual treatment in such cases.

Skin grafts were applied on four occasions, with a 75% take of the graft on each occasion. The cavity on the left side grew smaller and gradually was covered with skin and the bronchial openings which at first were large gradually closed.

At the time of the patient's death, three months after the last graft had been applied, there was no sign of an open bronchus. The surface skin on the chest wall showed a depression about one and one-half inches in diameter which entered into the lung. The cavity seemed to be completely covered by skin.

Dr. Vineberg bases his operation on considering a tuberculosis lung cavity as a chronic lung abscess. There is this difference, he points out: When a lung abscess is drained, the surrounding lung tissues fill in the defect, but in a tuberculous lung the tissues are usually diseased and cannot expand to fill the space occupied by the cavity. So he uses skin grafts to do this job of obliterating the cavity.

The operation has been performed on two other cases successfully and in both the cavities seem to be healing.

Science News Letter, October 22, 1949

PHYSICS

Improved Magnetometer Is Developed

➤ AN IMPROVED magnetometer, the instrument used trailing and under an airplane to locate submerged Nazi U-boats during the war, has been developed at the Naval Ordnance Laboratory, White Oak, Md., it is revealed in SCIENCE (Oct. 7), official publication of the American Association for the Advancement of Science.

The instrument is described by E. O. Schonstedt and H. R. Irons, of the laboratory staff, as a modified form of the airborne magnetometer developed by the Navy and industry during the war. It continuously records geomagnetic information from which all magnetic components may be determined.

The basic feature of the new magnetometer, they state, is that it now determines the total magnetic field vector instead of only the intensity. This is done by measuring the intensity and the direction of the total field vector with respect to a set of coordinate axes stabilized with respect to the surface of the earth.

The sensitive measuring element of the magnetometer is a saturable inductor which is excited by a current of sufficient amplitude to saturate its permalloy core. A current is generated by the inductor, the amplitude of which is proportional to the strength of the magnetic field along its axis.

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Photographs: Cover, American Red Cross; p. 261, New York Zoological Society; p. 263, Battelle Memorial Institute; p. 266, Marjorie Van de Water; p. 267, Hamilton Wright.

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PSYCHOLOGY

Cause of War Threat

Narrow ways of human behavior developed in childhood find expression through the aggressions and discriminations of our present day world.

➤ ONE of the reasons the world is threatened by global war is that both in Russia and United States people are following narrow ways of human behavior developed in their childhood.

This is the conclusion reached on the basis of animal experimentation by Dr. Edward C. Tolman, of the University of California, psychologist brother of the late Dr. Richard C. Tolman, noted for his part in developing the atom bomb.

Dr. Tolman's report to the PSYCHOLOGICAL REVIEW (July) was awarded an honorable mention by a committee of the American Psychological Association who selected the best psychological papers of the year.

Watching a rat learn to find its way without error from the starting point of a maze to the reward of food in the goal box, Dr. Tolman has concluded that the animal achieves this by assembling the cues coming to him through his senses and by working these over in the control room of his brain, making them into a tentative road map of his environment.

If this map is of the narrow strip-map type, it will enable the rat to find his way repeatedly to the goal, provided no changes are introduced in the maze.

But the rats, Dr. Tolman found, are able to produce a more comprehensive map with which they can adapt to changed conditions. In one series of experiments, the rats learned to find their way through an indirect pathway to the food box. Later the maze was changed so that the starting place was unchanged, but the latter part of the maze was replaced by a sunburst series of runways. It was found that the majority of the rats selected the pathway that led them nearest to the part of the room where the food was located, although by an entirely different route from that traveled previously.

The reason why the rats sometimes produce only the narrow strip-maps was explored by Dr. Tolman. They are induced by a damaged brain, by an inadequate array of environmental cues, by an overdose of repetitions on the original trained-in path and by too strong motivations or too intense frustrations.

With men as with rats, Dr. Tolman pointed out, if early learning is too strongly stamped in by excessive motivation or frustration, it is difficult to re-learn when the original path is no longer correct. And if the individual receives a shock, there is a tendency to regress to the earlier, now inappropriate pathway.

The displacement of hates and aggressions onto outsiders is also a narrowing of the road-map of life, Dr. Tolman feels, due to too great motivation or frustration.

"Over and over again," he says, "men are blinded by too violent motivations and too intense frustrations into blind and unintelligent and in the end desperately dangerous hatred of outsiders. And the expression of these displaced hates ranges all the way from discrimination against minorities to world conflagrations."

"We dare not let ourselves or others," Dr. Tolman warns, "become so overemotional, so hungry, so ill-clad, so overmotivated that only narrow strip-maps will be developed. All of us, in Europe as well as in America, in the Orient as well as in the Occident, must be made calm enough and well-fed enough to be able to develop truly comprehensive maps.

"We must, in short, subject our children and ourselves (as the kindly experimenter would his rats) to the optimal conditions of moderate motivation and of an absence of unnecessary frustrations, whenever we put them and ourselves before that great God-given maze which is our human world. I cannot predict whether or not we will be able, or be allowed, to do this; but I can say that, only insofar as we are able and are allowed, have we cause for hope."

Science News Letter, October 22, 1949

PLANT PATHOLOGY

Electron Microscope Aids Battle Against Cancer

➤ AN electron microscope attack on the cancer problem at the basic level of growth in its simplest form has been made by Prof. Robley Williams and Drs. Robert C. Backus and Russell L. Steere of the University of Michigan.

The growth curves for two plant viruses have been plotted for the first time in researches by these men. They have done this through counts of the number of virus particles seen in electron microscope pictures of the partially purified particles.

The significance of the growth curves was explained as follows:

"Now for the first time precise measurements can be made of the effects of chemical and physical agents on the growth of plant virus. We'll be able to show what things speed growth and what slows it down, and it's the latter we're most interested in."

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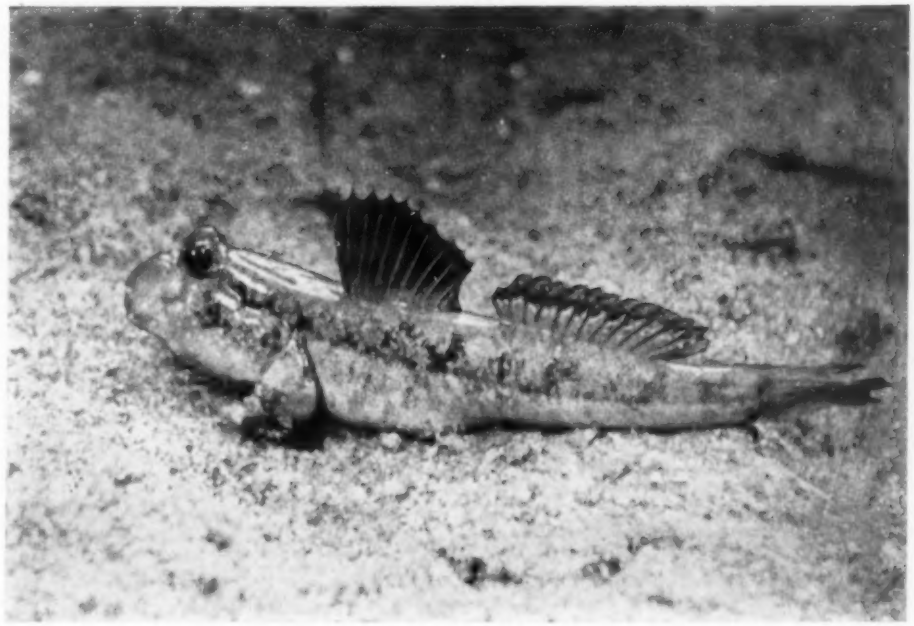

TROPICAL MUDSPRINGER—This strange-looking creature is a "fish out of water", and it feels perfectly at home. The mudspringer is a tropical fish of Africa, Australia and southeastern Asia, and it is so called because of the prodigious leaps it makes along the ground. It uses its strong front fins something like oars, pulling itself forward with a rowing motion. When fly-catching, or when eluding capture, it can leap and hop with great agility.

METEOROLOGY

No Weather "Cold War"

➤ SO far as the weather is concerned, the U.S.S.R. is exchanging information with the United States in a most cordial and effective manner, a check-up at the U. S. Weather Bureau reveals. The two nations are able to talk about each other's weather four times a day and the American forecasters are getting all the information they need to help predict general U. S. weather of next week and view world weather almost from hour to hour.

The interchange is by radio and there are no complaints about one nation jamming the other's radio transmissions of weather information. The facts about the weather are in prearranged international code, arranged through one of the few international organizations, besides the United Nations, to which the Soviets still adhere, the International Meteorological Organization.

Actually on a good day when radio reception is satisfactory, tthe U. S. forecasters have more weather observations from Soviet points than they have from the United States. This is because the U.S.S.R. covers more area.

Most useful to us are the observations from eastern Russia and Siberia because weather travels from west to east in the northern hemisphere and storms that originate there often come to Canada and the United States.

From 500 ground stations in the U.S.S.R. full reports are received every six hours when the radio conditions are good. This may drop to 200 on a day of bad radio reception. These 500 synoptic reports, as they are called, give temperature, pressure, wind direction and velocity, humidity, whether it is clear, cloudy, rainy, etc., visibility, pressure changes, which are all standard data. Comparatively, such reports are received from 400 U. S. stations.

We also know what the weather is in the air over a large number of Soviet points. From 65 to 70 Soviet localities pilot balloon observations, called "pibals" for short, are received four times daily. These give wind direction and velocity usually up to 25,000 to 30,000 feet on clear days, and occasionally to 50,000 feet. The number of U. S. Weather Bureau stations making pibal observations is about 150.

Radiosonde flights, which consist of miniature radio sending instruments carried aloft by balloons, provide temperature, pressure and humidity data up to 50,000 feet altitudes from 35 Soviet points each weather radio transmission. The coverage of the U. S. A. by such rayobs or rawin sondes, as they are also called, requires more than 50 such observations.

The Russian weather messages are usually copied at present in Tokyo and Germany, although they could be received directly in the United States if that seemed advisable, instead of having them relayed from overseas. Both American and Soviet weather messages are included in the international weather transmissions that anyone can pick up and decode and use. Most of the larger nations contribute to the world weather forecasting by issuing such information by regular radio transmissions.

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GENERAL SCIENCE

Strong Military Defense

➤ OVERLOOKED in the excitement of the Soviet atomic explosion is a strengthening of the military arm of the United States that promises to have far-reaching effects.

The Research and Development Board of the Department of Defense has been given more authority and responsibility. It can now see that what it believes should be done in weapon development is actually carried out. It has been moved from the situation of being advisory and getting results by knocking military heads together to one of being able to order things done.

Despite the effectiveness of the predecessor organization of World War II, the famous OSRD, the Office of Scientific Research and Development, headed by Dr. Vannevar Bush, the complaint of the key scientists in that organization was that it took too long to get the new discoveries and developments of the scientists into actual operation.

This was not a real criticism of the military men, for in general they realized the need of new methods to counter and surpass the enemy's technology. But it was necessary to go through another layer or echelon of command to get things moving that took precious and sometimes deadly time.

Now Dr. Karl T. Compton, chairman of the RDB, who was one of the Bush group, heads an organization that has the burden and opportunity of decision as well as development. In the new RDB set-up, there is now either an undersecretary or an assistant secretary of the Army, Navy and Air Force, as well as high-ranking officers. Thus there is a fusion of civilian and military command to help put scientific brainpower to work.

Just what the RDB is doing is largely secret. But experts come and go within the far-flung program. We can now expect that the direction of the search for better offense and defense will be shifted more rapidly than ever before, even if we can not hear about such changes.

For science, there is almost a feeling of active war in the air, with scientists saying less than ever they have since V-J day and fewer and fewer publications appearing in certain fields of development.

Science News Letter, October 22, 1949

On This Week's Cover

Greater stockpiles of blood, for use in event of an atomic war or other national disaster, may come through new methods being developed for the National Blood Program of the American Red Cross. On the cover Drs. John G. Gibson of Harvard Medical School and Charles P. Emerson of Boston University are shown inspecting a new silicone-coated blood collecting bottle in which the separation of red cells from plasma is speedily accomplished through the use of a blood substance, fibrinogen. (*See SNL*, April 30, p. 275 and May 14, pp. 314, 315.)

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PSYCHOLOGY

Answer to "Who Are You?" Varies with Age and Sex

➤ ASK a person "who are you?" and you'll get a wide variety of answers. Give those answers to a psychologist and he may find them psychologically significant.

So say Dr. James F. T. Bugental and Seymour Zalen, psychologists at the University of California at Los Angeles, who have asked this question of several hundred students, church members, white collar workers and laborers.

Those tested were asked to write three responses to the question. An analysis revealed that more than 18% considered themselves to be, first of all, a name such as "Joe" or "Bill." Slightly less than 18% replied with their occupational status, that is, student, riveter. The same percentage fell into the sex category, such as "I am a boy, a girl, a woman, a male."

One female very conscious of her femininity replied, "a female, a coed, a sister." Others identified themselves as a "unique person," "getting a kick out of life," "some joker."

Group patterns were evident in the over-all analysis. For example, older men seemed to favor occupational status, whereas, mature women favored family status. Younger subjects responded more often with sex identification and the youngest females seemed to favor social status.

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Mexican tortillas, pancakes made of corn meal, have higher nutritive value if made of a mixture containing one-tenth sesame meal.

ELECTRONICS

New Television Receiver

A new television receiver which will pick up the color broadcasting of all proposed systems has been revealed. It also reduces flicker problems.

➤ A NEW color television receiver, just revealed, will be able to pick up pictures, in either color or in black-and-white, of any of the color broadcasting systems now proposed. It will be able, also, to receive the present black-and-white broadcasting programs.

Details of this new receiver have been presented at the present hearings of the Federal Communications Commission in Washington, D. C. The commission is trying among other matters to determine if color broadcasting has reached a sufficiently developed stage to warrant the issuing of broadcasting licenses.

This new color receiver was developed by Dr. C. Willard Geer of the University of Southern California, Los Angeles. It can be manufactured to retail at a price approximately the same as present black-and-white television receivers. Also, it is not a bulky piece of apparatus, making it quite suitable for use in the ordinary home.

In addition, the color device of this receiver can be used as a color adapter to be placed on present black-and-white receivers as an auxiliary unit, or inside the set as a replacement at modest cost with a sufficient simplicity so that renovation can be accomplished by a competent television serviceman.

The color television tube which Dr. Geer has developed provides a receiving set which is all-electronic, direct-viewing, with no filters, no moving parts, no projection lenses, and no external apparatus requirements. For large screen or theater television it would lend itself to any projection system. Because it is direct-viewing and all-electronic, and utilizes no filters, its available amount of light is maximum and flicker problems are reduced to a minimum.

The simplest conception of how the tube operates may be obtained, Dr. Geer states, by likening it to the present three-color photographic process, in that three separate pictures (the green, the red, the blue) are painted upon the screen of the tube by three electron guns either all at the same time or in extremely rapid succession. With the light shining through, they are superimposed upon one another and give the effect of a complete natural color scene.

Two types of tubes were designed by Dr. Geer, the second of which is preferable. It has three electron guns placed upon the back of the tube at angles approximately 45 degrees each way from the perpendicular to the screen. The screen itself is made up of tiny pyramids which rise above the surface of the screen and in a concave manner go below the plane of the screen. All the surfaces of these pyramids facing toward one particular gun are phosphored with a particular primary color, and paint a complete picture in that color.

These pictures will all be painted at the same time, or in rapid sequence, producing a complete tri-color picture. On the same screen, merely by turning a switch so that all guns will receive the same signal, black-and-white may be received. The red gun will paint the black-and-white signal in red, the green in green, and the blue in blue. But these will add up to a black-and-white picture.

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CONSERVATION

Larger Lobsters Should Be Thrown Back

➤ "THROW it back, it's too big." This cry, reversing the usual watchword among fishermen, may soon be raised by Bermuda lobstermen, as a result of a preliminary study just completed.

The study shows that the larger lobsters have a much greater reproductive capacity than the smaller. A 15-inch female lays 2,500,000 eggs at a time, against a fourth that many for a 10-incher. Under present controls, all lobsters over four inches in body length may be taken. This results in a high percentage of captures of the prolific larger females.

Dr. E. P. Creaser, biologist at Hofstra College in Hempstead, N. Y., has just returned from the first year of a three-year study of the living habits of lobsters. He points out that before new legal limits are set, forbidding the taking of large lobsters, further investigation will be necessary. Dr. Creaser also recommends the construction of rock islands as experimental lobster shelters.

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PSYCHOLOGY

"One and Only," "Lucky In Love" Are Myths

➤ THE "One and Only Love" is a myth.

So declares Dr. Claude C. Bowman, sociologist of Temple University.

Another romantic myth, he says, is that a person is either lucky or unlucky in love.

The tendency of men and women to think of themselves as passive "pawns" controlled by mysterious forces called "luck," is due, Dr. Bowman believes, to prevailing ignorance of the processes of "falling in love."

It will probably be several decades before such knowledge is available, he predicts. The biological findings of Alfred Kinsey and his associates are only a beginning, he indicates.

But the studies of sex relations already available, although meager, tend to explode the romantic illusion that there is a single "soul mate" to whom one is attracted by a cosmic affinity that is powerful and not to be denied.

"It seems clear," reports Dr. Bowman to the AMERICAN SOCIOLOGICAL REVIEW (Oct.), "that heterosexual affections do not necessarily run in single channels. Often there are multiple attachments and a marital choice is made with the greatest difficulty. . . . Even after marriage, though the union is supported by legal and moral sanctions, the monogamous attachment may be weakened by extra-marital attractions."

But people go on thinking that in these unhappy cases, the men and women have not been fortunate enough to find their real "soul mate" and divorce courts are filled with people hoping for "better luck" next time in finding the ideal mate.

Actually, he says, among both sexes there must be a significant proportion who chafe under the necessity of concentrating all heterosexual interest upon a single person.

Science News Letter, October 22, 1949

NEW WELDING GUN—Welding aluminum plate is made easy with this gun which has no rods to change, and the worker "lays his bead" without interruption. The filler metal is fed to the gun automatically from the spool at the right. This process will increase the use of aluminum plate in industrial fabrication.

OPHTHALMOLOGY

Radioactive Chemical Treats Eye Tumors

➤ A RADIOACTIVE chemical from the atomic pile is now being used instead of radium or the related radon for treatment of certain eye conditions, three Cleveland, Ohio, scientists announced at the meeting of the American Roentgen Ray Society in Cincinnati, Ohio. The scientists are Dr. Hymer L. Friedell, Dr. Charles I. Thomas and Jack S. Krohmer.

The chemical, radioactive strontium, is put into a lucite capsule which completely encloses it and this capsule is then deposited in an aluminum applicator. This is used in direct contact in treatment of such eye ailments as superficial tumors, or growths, corneal ulcers and the inflammatory condition, conjunctivitis.

It is the beta rays from the radioactive strontium that are effective in treating these conditions, the Cleveland group explained. Their short range is particularly useful because deeper tissues such as the eye lens are not reached and therefore not damaged.

Radium and radon emit beta rays but they also emit the more deeply penetrating gamma rays which must constantly be guarded against in treatment of eye conditions. The lack of gamma rays constitutes one advantage of the radioactive strontium.

Science News Letter, October 22, 1949

DENDROLOGY

Revival of Chestnut Is Now Possible

➤ A REVIVAL of home-grown chestnuts may soon restore the all-American quality of Thanksgiving that it lost when the native tree was wiped out by the chestnut blight. The traditional roast turkey, now stuffed with Italian or Spanish chestnuts, may once more bulge with domestic ingredients.

This will be possible because three new chestnut varieties have been developed which produce a great quantity of large sweet nuts. The new nuts are larger, sweeter and less grainy than those now seen at the market. U. S. Department of Agriculture scientists who developed the trees say they are highly productive and, even more important, resistant to chestnut blight.

Graft trees of the new varieties, which are called Naking, Meiling, and Kuling, are now available through tree nurseries. If they live up to expectations, they will make us independent of foreign sources. The trees reach such high yields, over 100 pounds per tree, more than a ton per acre, that government experts foresee their widespread use as an orchard crop. They advise growers, however, to start out small, because the public will have to develop a taste for the nuts before they can be marketed in any quantity. They point out that it has been some years since chestnuts were a commonplace household item.

The new trees, developed under the direction of Dr. H. L. Crane of the Beltsville, Md., Research Center, are the culmination of nearly 40 years of research. In 1915 and earlier, chestnut trees were imported from China in order to develop a high nut-producing variety. The American chestnut was primarily a timber tree. Its nut production was relatively small and was considered of secondary importance.

The only result of these early experiments was to introduce the chestnut blight. The blight is native to the Orient and oriental trees had developed a resistance to it. The blight was unknown in the United States before then. It spread with remarkable rapidity throughout the stands of American chestnut and wiped them out.

The new trees, the best of some 400 types tested, flourish in the southeastern United States where trial plantings have been made. Dr. John W. McKay is conducting further tests at Beltsville to determine their suitability to northern and central states.

Science News Letter, October 22, 1949

ENGINEERING

Molten Zirconium Provides Very Brilliant Light

➤ A POOL of molten zirconium at a temperature of near 6,500 degrees Fahrenheit provides the light in a new lamp which has a brilliancy one-eighth that of the sun, it was revealed at the meeting of the Society of Motion Picture Engineers in Hollywood, Calif., by W. D. Buckingham of the Western Union Telegraph Company.

The particular applications for which this new light is suitable are in the fields of projection, television, photography, lithography and photo-copying. It will also have wide medical and scientific uses, and will be of especial importance in color photography.

It was described as a high-power, high-intensity electric arc light whose luminescent source is two-tenths of an inch in diameter. It operates in the open air and not in a glass bulb. It is said to be extremely stable in operation, producing a uniformly bright, sharply defined circular spot of white light of dazzling brightness. In a 1000-watt lamp, operating at 55 volts and 18 amperes alternating current, the light has 20 times the brightness of the ordinary tungsten filament lamp.

In spite of operating in the open air and at this extremely high temperature, the lamp can be made to have a life of several hundred hours, Mr. Buckingham explained. This is due to a unique operating principle whereby the zirconium metal is constantly renewed and reproduced from its own products of combustion. The electrodes are small and can be easily replaced. The new lamps may operate on either alternating or direct current.

Science News Letter, October 22, 1949

IN SCIEN

MEDICINE

Folic Acid Is More Deadly to the Female

➤ A CHEMICAL that is more deadly to the female than to the male has been discovered. The chemical is one of the newer vitamins, folic acid, or pteroylglutamic acid as it is called in chemical circles.

"Male mice easily tolerate amounts of this material lethal to every female injected," Drs. Alfred Taylor and Nell Carmichael of the University of Texas and the Clayton Foundation, Austin, Tex., reported to the Society for Experimental Biology and Medicine.

It was large doses, not the ordinary sized ones, that showed this sex selective lethal action.

"Why the female should be so much more susceptible than the male to high dosage of folic acid has not been determined," the scientists stated.

"So far as could be discovered, no other compound has ever been reported which manifests such a sex difference in its pharmacology (drug action)."

Smaller doses, which did not kill the females, nevertheless affected them more than the males. They averaged a 10% loss in body weight, followed by slow recovery, after a single injection of a dose that only slowed slightly but did not stop continued weight gains in young males.

More than 400 pure bred mice were used in the experiments.

Science News Letter, October 22, 1949

ENTOMOLOGY

New Automatic Sprays Banish Pests from Planes

➤ DANGEROUS, disease-carrying insects and agricultural pests on overseas transport planes can now be banished automatically by a flick of the pilot's finger.

The insecticide spray system, developed by the Navy in cooperation with the U. S. Public Health Service and the Department of Agriculture, will prevent undetected insects, such as the Hawaiian fruit fly or the oriental peach moth, from being flown into the United States.

Interiors of planes so equipped are sprayed before passengers are allowed aboard. After the passengers are seated, the pilot then gives the plane another, lighter dose sufficient to kill insects that might have flown into the plane during loading.

Use of the automatic system eliminates any possibility of missing certain recesses of the plane, such as the wheel wells, as might happen when spraying is done by hand.

Science News Letter, October 22, 1949

NE FIELDS

OPTICS

Supermicroscope Uses Mirrors Instead of Lenses

➤ SUPERMICROSCOPES that use mirrors instead of lenses to peer into the chemistry of cancer and other living tissues will soon be available to American scientists who have heretofore known them only through reports from English and Dutch scientists.

Because these new microscopes use mirrors instead of lenses, scientists can use them with both visible light to see the cancer or other tissues and with the invisible light of infra-red rays to identify chemical compounds in the material being seen through the microscope. They may also be used with ultraviolet light.

Reflecting microscopes developed abroad use aspherical mirrors which must be polished and corrected by hand, a costly and time-consuming process. Now a new system, using spherical mirrors which can be made by standard machine methods, has been developed by Arthur J. Kavanagh, research physicist at the American Optical Company's Stamford, Conn., research laboratory.

Plans to manufacture the new optical parts for use on any standard microscope stand are now being made at the company's instrument division in Buffalo, N. Y., Alva H. Bennett, director of the company's research laboratories, announced at the meeting of the Electron Microscope Society of America in Washington, D. C.

Scientists at the U. S. Bureau of Standards where the meeting was held were also informed that another manufacturer of optical equipment, Bausch and Lomb, has developed a reflecting type objective for use in ultraviolet light.

Science News Letter, October 22, 1949

PSYCHOLOGY

One-Arm Driver Has Unsteady Hand on Wheel

➤ THE one-arm driver does not have even one steady hand on the wheel, even if the other arm is not around a girl.

This is indicated by experiments conducted by Dr. Austin S. Edwards, of the University of Georgia, who tested the effect of this and other distractions on the involuntary movements in the arm and hand.

Using a mock-up auto steering wheel attached to scientific instruments that would measure unsteadiness in the arm and hand, Dr. Edwards found that if the individual keeps his attention fixed, looking steadily at a point about six feet in front of him, bright headlights flashed in his eyes or auto horn blasts sounded near him do not disturb him enough to make an appreciable change in the steadiness of his hands.

But if someone distracts the "driver's" attention to hand him a pencil, it disturbs him so that the involuntary movement in his hand goes up 4.46 times if it is a man, 4.91 times if it is a woman (the driver, that is.)

Asking him to look out the window increased the involuntary movement as much as 65%. Distracting his attention to look out the window when he had only one hand on the wheel was even more disturbing, causing a 304% increase in the trembling.

The psychologist does not report whether he measured the disturbance caused when the driver's arm is around the girl friend.

Dr. Edwards believes that his results are less than the disturbance of hand steadiness would be on the road.

"If so great increase of involuntary movement takes place in the relative quiet of the laboratory, how much is to be found under the disturbing conditions of actual automobile driving?" he asks.

Results of the study are reported in the JOURNAL OF APPLIED PSYCHOLOGY, published in Washington, D. C.

Science News Letter, October 22, 1949

DENTISTRY

Dentists May Soon Use New Metals

➤ USE of new metals for manufacture of false teeth, dental inlays and other dental material is foreseen by Dr. Joseph R. Lane of the Massachusetts Institute of Technology.

Tantalum, light weight metal which surgeons use to replace pieces of skull bone and in other ways, is one metal which Dr. Lane suggests might be useful also in dentistry.

Titanium, only recently available in quantity, a strong metal as corrosion-resistant as the stainless steels, is another which he thinks should be explored for possible dental uses.

The conventional gold and amalgam alloys now used in dentistry probably will be "steadily, though slowly, improved," he predicts in a report to the JOURNAL OF THE AMERICAN DENTAL ASSOCIATION (Oct.).

"With the alloys now at hand it would be entirely possible to produce dentures of considerably improved properties," he declares.

If dentists demanded stronger, more ductible dentures with more consistent and reproducible properties, they could, he says, be produced "with the knowledge now at hand and without a prohibitive increase in cost."

Science News Letter, October 22, 1949

PALEONTOLOGY

Bones of Birds Which Could Swim Are Found

➤ A JIG-SAW puzzle of fossil bird bones has been put together by Dr. Loye Holmes Miller, professor of zoology, emeritus, at the University of California at Los Angeles, to reveal the existence of a small, penguin-like bird that existed in southern California more than 3,000,000 years ago.

At that time most of the city of Los Angeles was under water and the flightless fowl, called Mancalla, paddled around with flippers which, in previous ages, might have been wings.

First evidence of the bird's existence was discovered 50 years ago when a single bone was dug up during the excavation for the Third Street tunnel in downtown Los Angeles.

Since then a number of fossil remains have been unearthed at various places in southern California. Sufficient remains now exist to furnish a rather accurate picture of the Mancalla, states the U. C. L. A. scientist.

The bird is biologically significant, he points out, because it is a good example of the way nature adapts her creatures to the situation at hand, in this case, for aquatics rather than flight.

Why did the Mancalla, members of the auk family, become extinct? At present the reason is not known, says Dr. Miller. Far to the south, birds of similar qualities, members of the albatross tribe, managed to survive. We know them as penguins.

Science News Letter, October 22, 1949

RADIO

Unstable Radio Reception Broadcasts To Begin

➤ UNSTABLE radio reception conditions, as well as normal and disturbed conditions, will be broadcast by the National Bureau of Standards in Washington, D. C., starting Nov. 1.

Station WWV, the Bureau's radio station that tells of the conditions in the atmosphere at 19 and 49 minutes past each hour, is adding this new service to warn operators that unstable conditions exist.

Previously only two radio reception conditions have been broadcast, the letter "N" in International Morse Code indicating normal conditions and the letter "W" warning that disturbed conditions are present or expected within 12 hours. Station WWV also broadcasts the standard musical pitch, time announcements and standard radio frequencies.

Unstable radio reception often occurs as major disturbances subside. Mobile services such as airplanes on transatlantic flights particularly and shortwave broadcasts experience difficulty at that time.

Science News Letter, October 22, 1949

ENGINEERING

Solutions to Air Pollution

Non-smoking factory stacks from overfire air jets, proper firing and new smokeless home heaters aid in the smoke abatement program.

By A. C. MONAHAN

➤ WITH winter ahead, smoke pollution of the atmosphere will greatly increase. The millions of coal furnaces in private homes will be partly responsible, and to their smoke will be added that from millions of heaters used in other types of buildings. Improperly adjusted oil and gas burners will also help.

Smoke alone is not the only air-polluter. However, it is the visible pollution and it is largely unnecessary. Fumes from industrial processes are often far more dangerous.

Elimination of fumes is a matter for owners and public authorities, but the authorities need public backing and perhaps public pushing. Smoke pollution from private furnaces can be controlled by the home-owner himself.

Cars Pollute the Air

Nature combines with man in polluting the atmosphere. Pure air is found only in places free from nature's pollution such as over certain mountain ranges and far out over the ocean. Dust is the ordinary pollutant, but the dust, in addition to tiny particles of earth, may contain germs, plant pollen and vegetation. Wind is responsible for the dust in the air, and also for the many miles that dust often travels.

Ordinarily of more importance is the air pollution from industrial activities that discharge invisible gases, fumes and chemicals into the air. Also important are the exhaust gases, including poisonous carbon monoxide, discharged by the millions of motor vehicles on American streets and those coming from the now widely used diesel engines. Atmospheric pollution from these sources presents one of the most difficult problems in the "pure air" program.

Smoke Abatement

Active steps have been long underway in industrial cities to abate the smoke and the accompanying fly ash nuisance. Some 50 American towns had anti-smoke regulations 25 years ago, and similar regulations had been enacted in many European industrial cities. Today, most American cities have antismoke regulations. Methods of smoke abatement are well established. But getting rid of the smoke and fly ash is only part of the job. The abatement of the invisible gases and fumes, which sometimes include active poisons, from factories, automobiles and incinerators is a problem yet far from solved.

"Smog" is defined in recent dictionaries, in which the relatively new word has found a place, as a combination of smoke and fog, particularly apt to occur in smoky cities. However it may be with Pittsburgh smog, Los Angeles smog can not be blamed on coal smoke because oil and natural gas are the principal fuels of southern California.

Los Angeles is reported to have some 10 to 20 days out of the year with smog so irritating that people's eyes and nostrils smart with it. Dust, industrial fumes and irritants resulting from the incomplete combustion of hydrocarbon fuels are thought to be to blame. The geographic position of the city seems to aid the collection of the smog in the urban area. It is a city ringed with mountains except on the ocean side. The smog appears on the days when normal winds do not drive the haziness away.

"Smokeless" Stacks

Earliest attention in the American smoke abatement problem was directed naturally toward the belching factory chimneys and equally obnoxious coal-burning steam locomotive stacks. Both are in year-round operation. They emit little more smoke in the winter months than during the summer. Scientists got busy on the problem years ago and reasonably successful methods for the abatement of their smoke have been worked out.

For the most part, industry cooperated with public officials in the smoke abatement program. Now the nuisance from these sources is approaching elimination. Underfeed stoker equipment and overfire air jets have been found to be effective methods for smoke abatement because they strike at the heart of the problem.

How they work is best understood with a knowledge of the generally accepted theory on the formation of smoke. Hydrocarbon vapors, when heated to high temperatures without enough oxygen to cause complete combustion, decompose to form finely divided carbon particles or soot. These are difficult to burn; hence, the fundamental principle of smoke abatement is not to burn smoke after it is formed, but to prevent its formation.

Overfire Air Jets

Overfire air jets accomplish this by forcing air into the furnace where it is needed and mixing it with unburned gases. If an excess of air is already present, the jets mix this air with the combustibles.

Tests have shown that, where there are no unburned-gas losses, but smoking is chronic, smoke is effectively eliminated with no change in boiler efficiency by the injection of overfire air accompanied by a compensating reduction in primary air supply to maintain constant excess air, according to a bulletin of Battelle Memorial Institute, Columbus, Ohio, where much study to the smoke abatement problem has been given.

Filtering, blowing and electrical means have all proved successful in smoke abatement from factory stacks. The filter, placed within the chimney, is a porous material that will not burn, such as steel wool, and it is capable of catching the fine particles in the smoke.

One blowing method uses the principle of centrifugal force in a whirling column of air to force the particles to the inside walls of the chimney for later cleaning. The electrical method gives the rising particles a static electric charge so that

BELCHING CHIMNEY — These factory chimneys which added greatly to air pollution are no longer necessary with the scientific smoke abatement methods now available.

SMOKELESS FURNACE—A smokeless household furnace of the University of Illinois, being inspected by Prof. J. R. Fellows, its inventor, has a coal-coking chamber in its front.

they are attracted to electric plates on the sidewalls.

Proper Firing

The principal part that home-owners can play in the smoke abatement program is in furnace firing. The handling of a home furnace requires skill. It pays to acquire the necessary skill. Proper firing not only eliminates smoke but it contributes heavily in fuel-bill savings.

Clean flues and properly operating checks and dampers are, of course, essential. Proper firing has to do with regulation of the furnace drafts and with the method that the coal is placed on the firebed. Bituminous coal contains considerable volatile combustible matters which are wasted up the chimney if not consumed in the furnace.

Spreading the coal over the entire bed of burning matter releases these volatiles, and releases also great quantities of smoke. Good firemen stack the bituminous coal in a cone in the center, or in a sloping heap on one side. Combustion then takes place at the foot of the slope, and little smoke results.

No matter how much the amateur or professional fireman may think he knows about the best methods of firing and operating a furnace, he should read the recommendations of experts which they base on scientific experimental work. Such recommendations are available without cost from the U. S. Bureau of Mines, several state universities and technical schools, and particularly from Bituminous Coal Institute, Washington, D. C.

Smokeless Furnaces

Old-style bituminous furnaces will necessarily be in use for many years, but in time they will be replaced with smokeless home-heaters recently developed. Among agencies responsible for these new-type furnaces are Bituminous Coal Research, Inc., Pittsburgh; Battelle Memorial Institute, Columbus, Ohio, and the Engineering Experiment Station of the University of Illinois at Urbana. Work in the latter two is under joint sponsorship of Bituminous Research and a group of stove manufacturers.

The so-called Illinois smokeless furnace shows the trend in development. In it, each charge of fresh coal is converted to coke in a coking chamber at the front of the furnace. Coking heat comes from the coke-burning chamber in the rear. The volatile matter released as a gas from the fresh coal in the coking process mixes with secondary air introduced through vertical air passages adjacent to the combustion flue. The mixture then passes over live coals in the coke-burning chamber, where it is ignited. The result is "no smoke."

Science News Letter, October 22, 1949

ANATOMY

Fetal Heart Is Simple, Grows to Complex Organ

➤ WHEN the heart starts out in the beginning of a new life, it is a very simple sort of pump and not the complex organ that it is when the animal gets to the point of starting life on its own, Dr. Bradley M. Patten, anatomy professor of the University of Michigan School of Medicine, explained in his first national Sigma Xi lecture at the University of Illinois in Urbana, Ill.

The first heart beat does not occur in a miniature of the chambered and efficiently valved adult heart, Dr. Patten explained. In the egg cell there are very simple structures that develop into a temporary cardiac pump that starts the circulation going and keeps it in operation during the time the most elaborate heart mechanism is being formed.

The young heart cannot cease operations "for alterations", Dr. Patten explained. All the time it is changing from the simple tubular structure which first sets the blood in motion, until it becomes its chambered and valved final form, the circulation can never be allowed to cease, even momentarily.

Although most of Dr. Patten's work has been done on the chick, studies show that there are similar stages in the human and other mammal hearts, and that the stages in the formation of the blood corpuscles and the beginning of circulation are similar.

Science News Letter, October 22, 1949

PHYSICS

Stay Away from Bats If Noises Irritate You

➤ IF THE sound of fingernails scratched on a blackboard or the squeak of a street car as it goes around a corner is annoying to you, don't go near bats.

Prof. W. H. Pielemeier of Pennsylvania State College, has found that the cry of a bat four inches from its mouth is 104 to 110 decibels in the 13 to 14 kilocycle sound band. This is about equivalent to the nerve-irritating noises of a fingernail on a blackboard or a trolley squeak.

Normal speech is about 60 to 70 decibels, and a jump of 40 decibels to 100 means an increase of 100 times in the intensity of the sound.

The bat's loud warning cry can be heard at a distance of 12 feet or more.

When several bats are flying near each other and are using their sodar system, a natural detecting system similar to sonar or to radar, they are not confused by each other. Possibly each one knows his own voice by its ultrasonic spectrum, Prof. Pielemeier concludes in his report to the Acoustical Society of America.

Science News Letter, October 22, 1949

PSYCHOLOGY

Potential Suicides Spotted

➤ MANY lives may be saved by the discovery that a widely-used personality test can be used to reveal suicidal tendencies before an actual attempt is made to destroy life.

The potential suicide is likely to evade direct questions about his suicidal intentions, Drs. Werner Simon and William M. Hales, of Veterans Administration Hospital, St. Cloud, Minn., state in reporting their finding to the AMERICAN JOURNAL OF PSYCHIATRY (Sept.). Less than one sixth of patients with suicidal tendencies said "no" when asked whether they usually feel that life is worth while.

They are, however, spotted by their "yes" answers to such indirect questions as the following:

I wish I could be as happy as others seem to be.

Criticism or scolding hurts me terribly.

I certainly feel useless at times.

I seldom worry about my health.

I am easily awakened by noise.

I work under a great deal of tension.

My hardest battles are with myself.

I frequently find myself worrying about something.

I have periods of such great restlessness that I cannot sit long in a chair.

I have several times given up doing a thing because I thought too little of my ability.

Because this test, known to professional people as the Minnesota Multiphasic Personality Inventory, is so widely used by psychiatrists, psychologists, social workers, vocational counsellors and personnel workers, the investigators feel that previously unsuspected suicidal risks may be picked up in this manner.

Science News Letter, October 22, 1949

MEDICINE

New Radiation Hazard

➤ A NEW radiation hazard has been discovered accidentally by atomic energy project workers at the University of California Medical School in Los Angeles, Calif.

Scientists using electron microscopes to get more knowledge for fighting disease may be getting dangerously large doses of radiation, the California scientists found. A person working a full day at the instrument they studied would get several hundred times the biggest dose considered safe.

A portion of the electron beam of the microscope strikes various metal parts of the instrument, generating continuous X-rays. The operator of the microscope may be exposed to this X-radiation through the various viewing apertures.

Discovery of the danger was made by Drs. Louis B. Silverman, Sylvia B. Elliott and M. A. Greenfield in the course of a general radiation survey of the atomic energy project at the medical school here. Their detection instruments showed radiation well above background levels in the vicinity of the 50 kilovolt electron microscope. Further checking showed that the dosage of X-rays at the intermediate viewing port was 70 milliroentgens per hour, whereas the maximum radiation exposure permitted at the medical school's atomic energy project is only 50 milliroentgens per day.

When a one-quarter inch thick lead plug was placed in each viewing port, X-ray dosage from the ports was reduced to less than one milliroentgen per hour.

"The high dosage had been due," the scientists report in the journal, SCIENCE (Oct. 7), "to the accidental use of ordinary glass instead of lead glass in the assembly of this instrument by the manufacturer.

"It is suggested," they warn, "that electron microscopists survey the radiation from viewing ports to determine whether or not the X-ray intensity exceeds the accepted tolerance dosage."

Science News Letter, October 22, 1949

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PSYCHOLOGY-ANTHROPOLOGY

Faulty Sex Relations Stem From Bottle Feeding Baby

➤ THE modern mother who gives her baby a lifeless, sexless bottle to suck instead of taking him to her own breast is laying the foundations for his later faulty sex relations in marriage.

This is pointed out by Dr. Margaret Mead, anthropologist of the American Museum of Natural History in a new book, MALE AND FEMALE (*Morrow*).

What the baby learns when his body is first laid against that of his mother is the physical forerunner of the sex relationship. The mother who "puts her baby on the bottle" is substituting a relationship between the child and an object, Dr. Mead points out.

We do not know, she says, at just what age the baby can distinguish the difference between a glass bottle with a rubber nipple, loose in space, from the breast which is part of the mother. But the mother knows the difference from the start and she makes it known to the child in her voice, in her hands, in the very tempo of her being. She is not giving the child herself; she is faithfully, efficiently providing the child with a bottle—an object.

Thus it is not surprising when the baby grows to manhood and thinks of his relationships with his wife in terms of automobiles, fur coats, or other gifts of lifeless objects.

Bottle-fed babies, both boys and girls, learn at the beginning of life that mother is there to put things into their mouths—bottles, spoons, crackers, teethers. Deep in the picture of the relationships between men and women comes this image of original satisfaction through having impersonal things put into the mouth.

"Later," writes Dr. Mead, "when the American soldier goes abroad, puzzled foreigners speculating on American morale will decide it is orange-juice or Coca-Cola or some other familiar item of American food or drink that is basically important."

Science News Letter, October 22, 1949

Words in Science—MYOPIA-HYPEROPIA

➤ THE defects in eyesight commonly known as nearsightedness and farsightedness are given names of Greek origin by your oculist.

Myopia is nearsightedness or shortsightedness. You say the word my-o-pea-ah with the accent on the o. It is due to too great refractive power of the lens of the eye so that rays from an object come to a focus before they reach the retina.

In hyperopia—pronounced high-per-o-pea-ah, stressing the o—the opposite condition exists so that the rays do not come to a focus by the time they reach the retina. This causes farsightedness.

Presbyopia, from Greek words which mean "old eyes," is a lack of accommodation from loss of elasticity of the lens, making it impossible to focus on objects close to the eyes. This affects people beyond the age of about forty.

Science News Letter, October 22, 1949

Teachers: HELP FOR YOU AND YOUR STUDENTS

"I think that SCIENCE NEWS LETTER is without doubt, the best way for a science teacher to get *the most for his money.*" A. RALPH BOXELL, Clinton High School, Clinton, Missouri.

"I read SCIENCE NEWS LETTER *as regularly* as my daily and *more closely.* It gives me much of what I *need.*" J. S. STANFORD, Assoc. Prof. of Zoology and Entomology, Utah State Agricultural College, Logan, Utah.

"Since I'm a senior in high school this year, I plan to enter the Science Talent Search. It gives me great pleasure to inform you that I have found *no better magazine* for reviewing the events of modern science than SCIENCE NEWS LETTER. My only regret is that I did not subscribe to it sooner than I did." JOHN KAUFMAN, Grinnell, Iowa.

"I take this opportunity to tell you that I am enjoying SCIENCE NEWS LETTER very much. It is a *clear, concise, and comprehensive digest* of current science. I find it very helpful in my science work." SISTER LORETTO THOMAS, St. Joseph High School, Pittsfield, Massachusetts.

"Our Superintendent and the Principal of our school thought SCIENCE NEWS LETTER so fine and valuable to the Science department that *they have paid for three subscriptions* to our school, one for each of the science teachers. I have a copy in my room each week and could not do without it. Many of my seventh grade students also read the paper. It is valuable for keeping me abreast of the times in science." NETTIE M. WISMER, Lawrence, Kansas.

"The kids (ages 6-10-11) *go for it each week*—swell." LT. COMDR. H. SEIELSTAD, U. S. Coast Guard, Cleveland, Ohio.

"I teach General Science in the Junior Part of the School, and naturally have to keep up to date in order to answer all the questions the children are so anxious to ask. It is hardly necessary for me to say *how welcome the postman is, when he brings another issue of* SCIENCE NEWS LETTER!" J. KENNETH BROWN, c/o Friends School, Hobart, Tasmania, Australia.

"I read your magazine and I think it is wonderful! It *should be in all schools* to promote science and American ingenuity." J. S. BACON, Breaux Bridge, Louisiana.

"I just got a term paper, my first, back with an 'A' on it. This grade is *largely a result* of your magazine." BILL NORTON, Marshalltown, Iowa.

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10-22-49

BOTANY

NATURE RAMBLINGS

Autumn Woods

➤ A RAMBLE through the woods at any season of the year is wine for the soul. An autumn ramble is sheer champagne.

It is a heady intoxicant whether gulped by the lungful while tramping, dog at heel, or whether sipped by the precious thimbleful while reclining easefully in a porch rocker.

The chief ingredients of this giddy mixture are known to all. The profuse brilliance of multi-colored leaves thrill even the most jaded. And after the leaves have fallen, and turned brown, every civilized community in the land is fragrant with the smell of burning leaves. A parfumier who could capture this indefinable and incomparable scent and put it up in bottles at so much the ounce would make his fortune. "Burnt Passion" would not be too lurid a name for it.

But leaves brilliant and leaves burnt are only the gross ingredients. The autumn recipe is a masterly concoction rendered subtle with pinches and dashes of sight, sound and seasoning.

It is not only the tilled field that comes to autumn harvest. The autumn woods are a cornucopia of nuts, fruits, seeds and berries. There is hazel nut and hickory nut, and fox-grape, wild plum and pawpaw. The flamboyant flowering dogwood hangs out clusters of scarlet berries to give pleasure to man and winter groceries to the white-footed mouse. The doomed chestnut is still to be seen at rare intervals, even though the chestnut blight has all but wiped it out in this country. Botanists take hope from these hardy lonely survivors that perhaps a resistant strain will develop either in the wild or in the tree-nursery. Then perhaps the delicious sweet chestnut wrapped in its characteristic prickly burr, will become plentiful once more.

The observant eye will notice one bloom when all the other trees and plants are long past flowering. This is the witch hazel which flowers late in September or October. When all the other trees are decked out in the traditional fall raiment, the witch hazel shrub is just putting out its blooms. It waits until its leaves have turned a golden yellow, sometimes even until it has shed them entirely, to burst forth in stemless clusters of yellow flowers, each with four long narrow petals. A little later when this floral display is over, the witch hazel adds a percussion instrument to the fall orchestra of sound. The petals fall off, and the pod dries, and suddenly with a snapping, popping sound the witch hazel flings its seeds to a distance of 10 or 15 feet.

All these sights and sounds and smells are part of nature's preparations for winter. For nature they are merely practical, for man sheerly beautiful. Autumn is intoxicating, and each year is a vintage year.

Science News Letter, October 22, 1949

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ARCHAEOLOGY

Ancient Ax-Heads Made Of Bone Discovered

➤ DISCOVERY of ancient bone ax-heads that led stone age man on the banks of the Nile to invent a better kind of stone ax, copied from the bone ones, is reported by Dr. A. J. Arkell of London's University College Department of Egyptology.

This new chapter in how the ax with a handle came to be developed was unearthed at the Neolithic archaeological site of Esh Shaheinab on the west bank of the Nile, excavated by the Sudan Government Antiquities Service this year.

Eleven polished bone ax-heads, ranging from the eight to three inches in length, were found. They were made from long bones of the hippopotamus, rhinoceros, elephant and perhaps other animals. Fragments of 65 other axes were found. All had been given a sharp cutting edge by rubbing on sandstone grinders used by the ancient men for grinding red ochre, favorite coloring material for decorating themselves.

Along with the bone ax-heads, many stone-axes were discovered in the same hearth layer of soil representing many campfires. The stone tools were generally smaller although some were the same size as the bone ones.

Dr. Arkell in his communication to the British journal, NATURE (Oct. 1), explains that the hunters of the large animals probably first used large splinters of the animal bones for hacking meat off their kill. The next step was to fit the splinter into a wooden handle, making a more efficient hacking tool.

That was the invention of the ax. They naturally tried the new tool on wood, perhaps in hollowing out dug-out canoes and for making spear-throwers. But when the bone ax was not strong enough to cut any but the softest woods, they copied the bone ax in stone.

Thus the chipped and partly polished stone ax-head of the Neolithic age was invented.

A notched fish-hook made from a bivalve shell was also discovered at the same site.

Science News Letter, October 22, 1949

BOTANY-CHEMISTRY

Pine Tree Has Its Spring in the Fall

➤ SPRING has come in the fall to an astonished pine tree which was given a chemical treatment in June.

Typical spring growth in a certain type of wood cell, known as tracheid, was found 10 weeks after a few crystals of heteroauxin had been put in a hole bored in a branch.

Heteroauxin is a plant growth promoter known to chemists as indole 3-acetic acid. Its season-speeding effect was reported by D. A. Fraser of the Forest Insect Laboratory, Sault Ste. Marie, Ont. When the branch in which the crystals were placed was examined, cells of spring wood growth were found.

The annual rings by which a tree's age is calculated are told by the contrasting appearance between spring and summer growth. Getting typical spring growth in the fall is one of the results of a series of experiments designed to increase knowledge of a tree's growth.

Science News Letter, October 22, 1949

• Books of the Week •

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ALTERATION OF THE PROPERTIES OF BENTONITE BY REACTION WITH AMINES—John W. Jordan—*Mellon Institute*, 8 p., illus., paper, free upon request to publisher, University of Pittsburgh, Pittsburgh 13, Pa. Reports observations on the conversion of bentonite from the hydrophilic to the organophilic condition. A technical report.

BRAZIL: An Expanding Economy — George Wythe, Royce A. Wight, and Harold M. Midkiff—*Twentieth Century Fund*, 412 p., illus., $3.50. A study concerned particularly with how the capital and skills of the United States might be helpful in raising Brazil's living standards.

EFFICIENT USE OF FERTILIZERS—Vladimir Ignatieff Ed.—*Food and Agriculture Organization of the United Nations*. 182 p., illus., paper, $2.00. A monograph bringing together world-wide experience in the use of animal manures, fertilizers, and soil amendments, such as lime.

EMOTIONAL DISORDERS OF CHILDREN: A Case Book of Child Psychiatry—Gerald H. J. Pearson—*Norton*, 368 p., $5.00. An immense amount of material on the clinical problems of children who suffer from neuroses, character disturbances and psychoses.

FIFTH CATALOGUE OF THE ORBITAL ELEMENTS OF SPECTROSCOPIC BINARY STARS—J. H. Moore and F. J. Neubauer—*University of California Press*, 31 p., illus., paper, 25 cents. Brief and pertinent data relating to the orbits of these stars.

FORTUNE POKER—George S. Coffin—*McKay*, 198 p., illus., $2.50. A world-wide roundup of material on this game, telling of the mathematical probabilities in obtaining the different poker combinations, for instance: a royal flush. Another interesting thing is the author's explanation of the strategy of poker.

HANDBOOK OF CHEMISTRY—Norbert Adolph Lange, Compiler and Editor—*Handbook Publishers*, 7th ed., 1920 p., illus., $7.00. Compiles an immense amount of reference material. A new edition of this well-known handbook.

HOW LARGE ARE OUR PUBLIC HIGH SCHOOLS?—Walter H. Gaumnitz and others—*Gov't. Printing Office*, 39 p., illus., paper, 25 cents. A statistical report arranged to present data which are readily comparable one state with another and one size group with another.

HANDBOOK OF SOUTH AMERICAN INDIANS, Vol. 5: The Comparative Ethnology of South American Indians—Julian H. Steward, Ed.—*Gov't. Printing Office*, 818 p., illus., $3.00. The first four volumes of this work described the history and prehistory of Indians by tribes and areas. This volume deals with topics such as religion, learning, manufactures, etc., and deals with all of South America.

HOW SHALL WE PAY FOR HEALTH CARE?—Oscar R. Ewing and George F. Lull—*Public Affairs Committee*, 32 p., illus., paper, 20 cents. The two authors present arguments for and against compulsory health insurance.

HOW YOUR BODY WORKS—Herman and Nina Schneider—*Scott*, 160 p., illus., $2.50. An attractive book for children including experiments that are fun and easy to do.

AN INTRODUCTION TO CRIMINALISTICS: The Application of the Physical Sciences to the Detection of Crime—Charles E. O'Hara and James W. Osterburg—*Macmillan*, 705 p., illus., $10.00. A college text for the student of police science.

JEST WHAT THE DOCTOR ORDERED—Francis Leo Golden—*Fell*, 256 p., illus., $2.95. Jokes that one doctor might tell another.

KNOW THE EGGS YOU BUY—United States Department of Agriculture—*Gov't. Printing Office*, illus., paper, five cents. A reprint of the small size color chart "Know the Eggs You Buy."

THE LAST SPACE SHIP—Murray Leinster—*Fell*, 239 p., $2.50. A science fiction story describing the adventures of Kim Rendall on the distant planet Mars. In that world, *teleportation* of matter has taken the place of transportation via rocket and atomic-powered vessels.

MALE AND FEMALE: A Study of the Sexes in a Changing World—Margaret Mead—*Morrow*, 477 p., $5.00. An account of conclusions based on 14 years' research on sex relations among some of the primitive peoples of the Pacific islands and also in modern United States.

NUTRITION OF THE DOG—Clive M. McKay—*Comstock*, 2nd ed., 337 p., illus., $3.50. Revised and extended to include modern advances and more of the older discoveries that are useful in feeding dogs. For dog owners and all those interested in their care.

PHILOSOPHIES IN BRIEF—Frederick E. Eastburg—*Humphries*, 78 p., $2.50. Reviews with extreme brevity various schools of philosophical thought.

RED PLANET—Robert A. Heinlein—*Scribners*, 211 p., illus., $2.50. A science fiction book telling a story of a group of earth people who attempt some time in the future to colonize Mars.

REGULAR POLYTOPES—H. S. M. Coxeter—*Pitman*, 321 p., illus., $10.00. Brief excursions into such subjects as algebra, vector analysis, integral calculus, crystallography and topology.

SOIL . . . PEOPLE, AND FERTILIZER TECHNOLOGY—Tennessee Valley Authority—*Gov't Printing Office*, 57 p., illus., paper, 30 cents. A brief history of the TVA.

TEXTBOOK OF PHYSIOLOGY—John F. Fulton—*Saunders*, 16th ed., 1258 p., illus., $10.00 A reference book revised to include a large volume of new material.

A TREASURY OF HERO STORIES FOR BOYS AND GIRLS FROM 8 TO 13—Joanna Strong and Tom B. Leonard—*Hart*, 191 p., illus., $2.00. Short biographies of some of our favorite heroes and heroines. For young scientists there is brief information on the Heroes of Yellow Jack, Florence Nightingale, and Admiral Peary.

TRAINING RURAL LEADERS: An FAO Study—Shantan Bailie. School—*Food and Agriculture Organiation of the United States*, 136 p., illus., paper, $1.50. Describes experimental work in training for rural leadership at China's Shantan Bailie school.

VANISHING WILDERNESS—Francesca La Monte and Micaela Welch—*Liveright*, 340 p., illus., $2.49. The life stories of 19 wild animals whose home is the fast vanishing wilderness. The authors have interwoven into these stories a mixture of history, biology, geography, and a wealth of other information. For children and adults.

WEBS IN THE WIND: The Habits of Web-Weaving Spiders—*Ronald*, 387 p., illus., $4.50. A report of a two-year study of these superb architects and engineers. The author's approach is unusual in that she knew nothing about spiders to begin with, and so, in this book takes her readers along with her in a step by step journey in the study of these creatures.

THE YEAST CELL: ITS Genetics and Cytology—Carl C. Lindegren—*Educational*, 28 chapters, illus., $7.00. A reference guide containing the latest findings of the author and his associates. The author concludes that Mendelian theory of heredity applies only to a small fraction of the heredity characteristics transmitted from parent to offspring; however, he differs from Lysenko in that he believes that heredity is under strict gene control.

Science News Letter, October 22, 1949

America's *oldest zoo* is the well-known Philadelphia Zoological Garden, now 75 years old.

The mileage of *pipelines* used in the natural gas industry in America is over 250,000, or 25,000 more miles than all the railroad trackage.

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ELECTRIC HONE, for use in homes, factories and on farms, will sharpen tools from kitchen knives to garden hoes without burning blades or grinding them away. Plugged into the household electric socket, it employs what the makers called a magnetic honing action, without use of wheels or gears.

Science News Letter, October 22, 1949

ICE CRUSHER, built into one of the well-known automatic ice makers, permits the refrigerator to deliver uniformly crushed ice crystals or cubes as desired, by the flip of a switch. It is designed for use in hotels, clubs, taverns and other beverage and food dispensers.

Science News Letter, October 22, 1949

STEEL BRIDGING, to replace the short wood pieces set in at an angle between joists in floor structure for reinforcement, comes in stock size for joists of any standard depths installed on 16-inch centers. The bridge fits over the top of one, with its ends on the underside of adjacent joists, and requires only two nails to fix in place.

Science News Letter, October 22, 1949

MUSICAL INSTRUMENT for youngsters, shown in the picture, is described as a cross between clarinet, harmonica and button accordian. It is an inexpensive plastic device with ten button keys regulating the tone of 20 notes, and is capable of covering a wide range of musical selections.

Science News Letter, October 22, 1949

AIR DEODORIZER, available in handy "aersol" containers in which it is pressurized by Freon-12, is a non-inflammable and non-toxic type that destroys unpleasant odors by chemical action. This improved spray is claimed to be effective against most odors, including formaldehyde and ammonia.

Science News Letter, October 22, 1949

SUCTION HOLDER, for the permanent attachment of towel racks and other fixtures to metal, glass or tile without drilling a hole, has a suction cup and a metal shield arrranged in such a manner that air can enter the vacuum only by passing through a zone of rubber-like material under compression.

Science News Letter, October 22, 1949

COLOR COMPARER enables the amateur photographer to match duplicate prints exactly in the developing tray. It is shaped like a four-leaf clover, the leaves in color varying from flesh to dark skies. In the center of each is a hole through which the print is color-matched with the leaf.

Science News Letter, October 22, 1949

Do You Know?

One type of airplane *jet engine* requires 100 tons of air every hour.

Noise limits may some day become common in American cities as speed limits are now.

Glass is usually a clear transparent material, but when ground to a fine powder it is white like salt.

Nature has endowed most *fishes* with ability to reproduce far more of their kind than can be reared to usable size in a given body of water.

Common glass is composed of silica sand, soda ash and lime, but there are thousands of special compositions, some quite complex.

White-footed or *deer mice* often live in hollow trees and are valuable animals because they destroy certain insect life, particularly the destructive pupating larch sawfly.

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